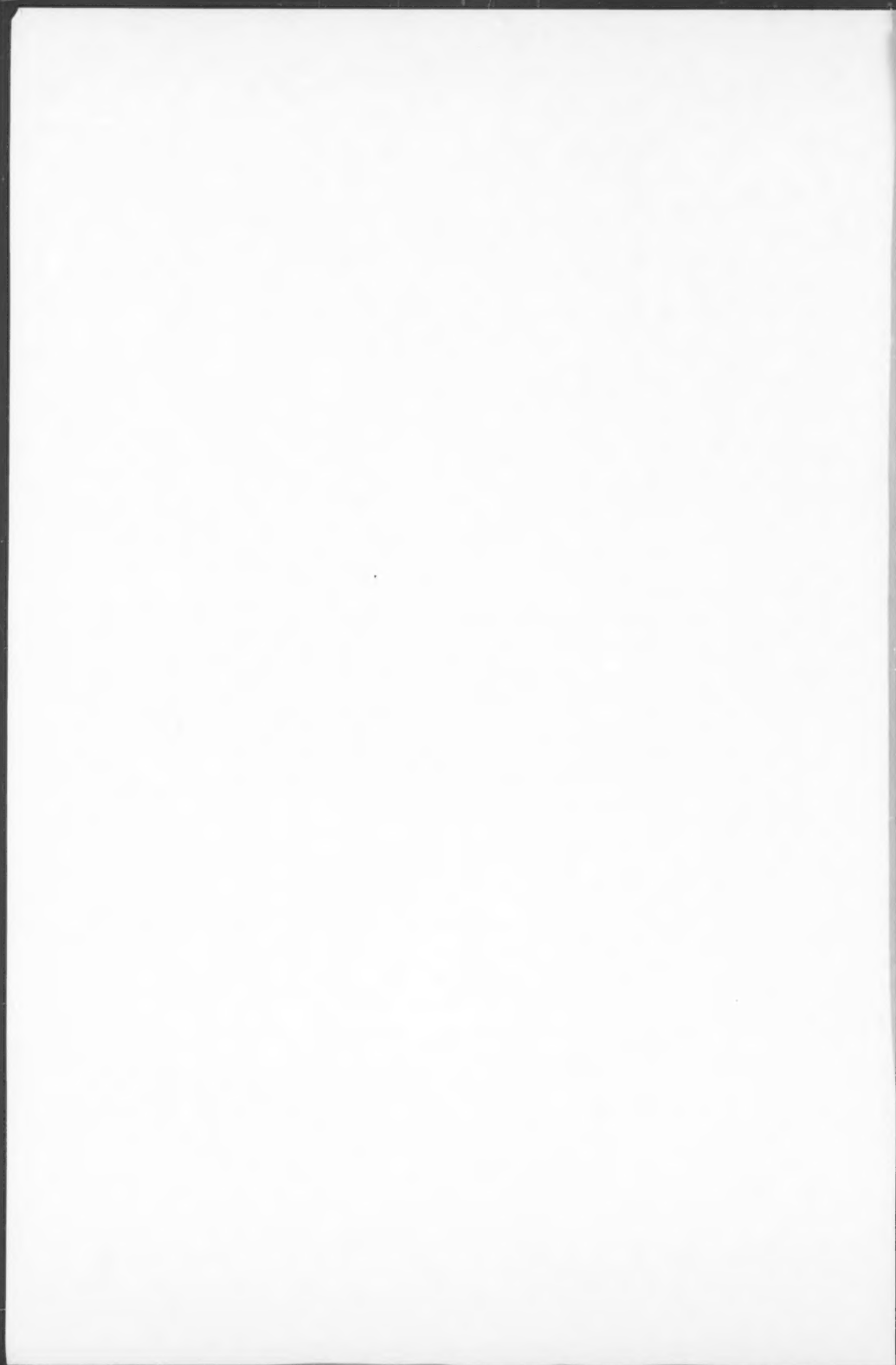


THE ANNALS
of
STATISTICS

AN OFFICIAL JOURNAL OF THE INSTITUTE OF
MATHEMATICAL STATISTICS

VOLUME 8

1980



CONTENTS OF VOLUME 8

ARTICLES AND SHORT COMMUNICATIONS

AGARWAL, GIRDHAR G. AND STUDDEN, W. J. Asymptotic integrated mean square error using least squares and bias minimizing splines	1307-1325
AHMAD, IBRAHIM A. On the Berry-Esseen theorem for random U -statistics	1395-1398
ALEXANDER, CHARLES H. Simultaneous confidence bounds for the tail of an inverse distribution function	1391-1394
AMEMIYA, TAKESHI. The n^{-2} -order mean squared errors of the maximum likelihood and the minimum logit chi-square estimator ...	488-505
ANDERSON, G. LEIGH AND FIGUEIREDO, RUI J. P. DE. An adaptive orthogonal-series estimator for probability density functions ...	347-376
ATWOOD, CORWIN L. Convergent design sequences for sufficiently regular optimality criteria, II: singular case	894-912
BAKSALARY, J. K. AND KALA, R. A new bound for the Euclidean norm of the difference between the least squares and the best linear unbiased estimators	679-681
BASAWA, I. V. Remarks on Bahadur optimality of conditional tests ...	1382-1387
BEN, M. S. GARCIA AND YOHAI, V. J. Canonical variables as optimal predictors	865-869
BERAN, RUDOLF. Asymptotic lower bounds for risk in robust estimation	1252-1264
BERGER, JAMES. A robust generalized Bayes estimator and confidence region for a multivariate normal mean	716-761
BERGER, JAMES. Improving on inadmissible estimators in continuous exponential families with applications to simultaneous estimation of gamma scale parameters	545-571
BERKSON, JOSEPH. Minimum chi-square, not maximum likelihood! Discussion by Bradley Efron, J. K. Ghosh, L. Le Cam, Johann Pfanzagl and C. Radhakrishna Rao	457-487
BHATTACHARYA, C. G. Estimation of a common mean and recovery of interblock information	205-211
BIRKES, DAVID AND SEELY, JUSTUS. Estimability in partitioned linear models	399-406
BOOS, DENNIS D. AND SERFLING, R. J. A note on differentials and the CLT and LIL for statistical functions, with applications to M -estimates	618-624
BRADLEY, RALPH A. AND YEH, CHING-MING. Trend-free block designs: theory	883-893
BRANDWEIN, ANN COHEN AND STRAWDERMAN, WILLIAM E. Minimax estimation of location parameters for spherically symmetric distributions with concave loss	279-284

BROWN, LAWRENCE D. A necessary condition for admissibility	540-544
BROWN, L. Examples of Berger's phenomenon in the estimation of independent normal means	572-585
BROWN, L. D., COHEN, ARTHUR AND STRAWDERMAN, W. E. Complete classes for sequential tests of hypotheses	377-398
BROWN, P. J. AND ZIDEK, J. V. Adaptive multivariate ridge regression	64-74
BRUVOLD, NORMAN T. Admissible designs for polynomial monospline regression	913-921
CALLAERT, H., JANSSEN, P. AND VERAVERBEKE, N. An Edgeworth expansion for U -statistics	299-312
CASELLA, GEORGE. Minimax ridge regression estimation	1036-1056
CHENG, CHING-SHUI. Optimality of some weighing and 2^n fractional factorial designs	436-446
CHENG, CHING-SHUI. Orthogonal arrays with variable numbers of symbols	447-453
CHENG, CHING-SHUI AND WU, CHIEN-FU. Balanced repeated measurements designs	1272-1283
CHENG, H. H. PETER. Asymptotic expected inferior sample size of a sequential test involving two populations	845-850
CHERNOFF, HERMAN. The identification of an element of a large population in the presence of noise	1179-1197
CHRISTOPEIT, N. AND HELMES, K. Strong consistency of least squares estimators in linear regression models	778-788
COHEN, ARTHUR, STRAWDERMAN, W. E. AND BROWN, L. D. Complete classes for sequential tests of hypotheses	377-398
CROOK, J. F. AND GOOD, I. J. On the application of symmetric Dirichlet distributions and their mixtures to contingency tables, part II	1198-1218
CROWDER, MARTIN J. On the asymptotic properties of least-squares estimators in autoregression	132-146
DAHIYA, RAM C. AND KORWAR, RAMESH M. Maximum likelihood estimates for a bivariate normal distribution with missing data	687-692
DALAL, S. R. AND HALL, GAINEFORD J., JR. On approximating parametric Bayes models by nonparametric Bayes models	664-672
DARROCH, J. N., LAURITZEN, S. L. AND SPEED, T. P. Markov fields and log-linear interaction models for contingency tables	522-539
DAWID, A. PHILIP. Conditional independence for statistical operations	598-617
DEGROOT, MORRIS H. AND GOEL, PREM K. Estimation of the correlation coefficient from a broken random sample	264-278
DEVROYE, LUC P. AND WAGNER, T. J. Distribution-free consistency results in nonparametric discrimination and regression function estimation	231-239
EDDY, WILLIAM F. Optimum kernel estimators of the mode	870-882
EISENBERG, BENNETT AND GHOSH, B. K. Curtailed and uniformly most powerful sequential tests	1123-1131

FIGUEIREDO, RUI J. P. DE AND ANDERSON, G. LEIGH. An adaptive orthogonal-series estimator for probability density functions	347-376
FOUTZ, ROBERT V. A test for goodness-of-fit based on an empirical probability measure	989-1001
FREEDMAN, DAVID AND LANE, DAVID. The empirical distribution of Fourier coefficients	1244-1251
FULLER, WAYNE A. Properties of some estimators for the errors-in-variables model	407-422
GALIL, Z. AND KIEFER, J. <i>D</i> -optimum weighing designs	1293-1306
GHOSH, B. K. AND EISENBERG, BENNETT. Curtailed and uniformly most powerful sequential tests	1123-1131
GHOSH, J. K., SINHA, B. K. AND WIEAND, H. S. Second order efficiency of the MLE with respect to any bounded bowl-shaped loss function	506-521
GHOSH, MALAY AND MUKHOPADHYAY, NITIS. Sequential point estimation of the difference of two normal means	221-225
GHOSH, SUBIR. On main effect plus one plans for 2^m factorials	922-930
GLYNN, WILLIAM J. Asymptotic representations of the densities of canonical correlations and latent roots in MANOVA when the population parameters have arbitrary multiplicity	958-976
GODOLPHIN, E. J. An invariance property for the maximum likelihood estimator of the parameters of a Gaussian moving average process	1093-1099
GOEL, PREM K. AND DEGROOT, MORRIS H. Estimation of the correlation coefficient from a broken random sample	264-278
GOOD, I. J. AND CROOK, J. F. On the application of symmetric Dirichlet distributions and their mixtures to contingency tables, part II . . .	1198-1219
GREGORY, GAVIN G. On efficiency and optimality of quadratic tests	116-131
GREGORY, P. AND SIEGMUND, D. A sequential clinical trial for testing $p_1 = p_2$	1219-1228
GUPTA, SHANTI S. AND HUANG, DENG-YUAN. A note on optimal subset selection procedures	1164-1167
HAFF, L. R. Empirical Bayes estimation of the multivariate normal covariance matrix	586-597
HALL, GAINEFORD J., JR. AND DALAL, S. R. On approximating parametric Bayes models by nonparametric Bayes models	664-672
HANNAN, E. J. Recursive estimation based on ARMA models	762-777
HANNAN, E. J. The estimation of the order of an ARMA process . . .	1071-1081
HELMERS, R. Edgeworth expansions for linear combinations of order statistics with smooth weight functions	1361-1374
HELMES, K. AND CHRISTOPEIT, N. Strong consistency of least squares estimators in linear regression models	778-788
HERRMANN, NIRA AND SZATROWSKI, TED H. Expected sample size savings from curtailed procedures for the <i>t</i> -test and Hotelling's T^2	682-686

HUANG, DENG-YUAN AND GUPTA, SHANTI S. A note on optimal subset selection procedures	1164-1167
IRLE, ALBRECHT AND KLÖSENER, KARL-HEINZ. Note on the sign test in the presence of ties	1168-1170
JAMES, IAN R. AND MOSIMANN, JAMES E. A new characterization of the Dirichlet distribution through neutrality	183-189
JANSEN, PAUL, VERAVERBEKE, N. AND CALLAERT, H. An Edgeworth expansion for U -statistics	299-312
KABAILA, PAUL V. An optimality property of the least-squares estimate of the parameter of the spectrum of a purely nondeterministic time series	1082-1092
KALA, R. AND BAKSALARY, J. K. A new bound for the Euclidean norm of the difference between the least squares and the best linear unbiased estimators	679-681
KARIYA, TAKEAKI. Locally robust tests for serial correlation in least squares regression	1065-1070
KAWASHIMA, HIRONAO. Parameter estimation of autoregressive integrated processes by least squares	423-435
KIEFER, J. AND GALIL, Z. D -optimum weighing designs	1293-1306
KING, M. L. Robust tests for spherical symmetry and their application to least squares regression	1265-1272
KLÖSENER, KARL-HEINZ AND IRLE, ALBRECHT. Note on the sign test in the presence of ties	1168-1170
KORWAR, RAMESH M. AND DAHIYA, RAM C. Maximum likelihood estimates for a bivariate normal distribution with missing data	687-692
KUSHNER, H. B. AND MEISNER, MORRIS. Eigenfunctions of expected value operators in the Wishart distribution	977-988
LANE, DAVID AND FREEDMAN, DAVID. The empirical distribution of Fourier coefficients	1244-1251
LAURITZEN, S. L., SPEED, T. P. AND DARROCH, J. N. Markov fields and log-linear interaction models for contingency tables	522-539
LAYCOCK, P. J. AND SEIDEN, E. On a problem of repeated measurement design with treatment additivity	1284-1292
LINDLEY, DENNIS V. L. J. Savage—His work in probability and statistics	1-24
LOYNES, R. M. The empirical distribution function of residuals from generalised regression	285-298
MALLOWS, C. L. Some theory of nonlinear smoothers	695-715
MARDEN, JOHN AND PERLMAN, MICHAEL D. Invariant tests for means with covariates	25-63
MASRY, E. Discrete-time spectral estimation of continuous-time processes — the orthogonal series method	1100-1109
MEISNER, MORRIS AND KUSHNER, H. B. Eigenfunctions of expected value operators in the Wishart distribution	977-988
MIHALKO, DANIEL P. AND MOORE, DAVID S. Chi-square tests of fit for type II censored data	625-644

MILLER, JOHN J. AND SZATROWSKI, TED H. Explicit maximum likelihood estimates from balanced data in the mixed model of the analysis of variance	811-819
MOORE, DAVID S. AND MIHALKO, DANIEL P. Chi-square tests of fit for type II censored data	625-644
MOSIMANN, JAMES E. AND JAMES, IAN R. A new characterization of the Dirichlet distribution through neutrality	183-189
MUKHOPADHYAY, NITIS AND GHOSH, MALAY. Sequential point estimation of the difference of two normal means	221-225
NAIR, K. AIYAPPAN. Distribution of an estimator of the common mean of two normal populations	212-216
NELSON, PAUL I. A note on strong consistency of least squares estimators in regression models with martingale difference errors ..	1057-1064
NOVIC, BRADLEY. Bayes sequential estimation of a Poisson rate: a discrete time approach	840-844
OLKIN, INGRAM AND PERLMAN, MICHAEL D. Unbiasedness of invariant tests for MANOVA and other multivariate problems	1326-1341
OUDE VOSHAAR, JAN H. ($k-1$)-mean significance levels of nonparametric multiple comparisons procedures	75-86
PERLMAN, MICHAEL D. Unbiasedness of the likelihood ratio tests for equality of several covariance matrices and equality of several multivariate normal populations	247-263
PERLMAN, MICHAEL D. AND MARDEN, JOHN. Invariant tests for means with covariates	25-63
PERLMAN, MICHAEL D. AND OLKIN, INGRAM. Unbiasedness of invariant tests for MANOVA and other multivariate problems	1326-1341
PETRUCCELLI, JOSEPH D. On a best choice problem with partial information	1171-1174
PHADIA, E. G. A note on empirical Bayes estimation of a distribution function based on censored data	226-229
PHADIA, E. G. AND VAN RYZIN, J. A note on convergence rates for the product limit estimator	673-678
POLLAK, MOSHE AND RINOTT, JOSEF. A stochastic ordering induced by a concept of positive dependence and monotonicity of asymptotic test sizes	190-198
RASMUSSEN, SHELLEY L. A Bayesian approach to a problem in sequential estimation	1229-1243
REISS, R.-D. Estimation of quantiles in certain nonparametric models	87-105
RIEDER, HELMUT. Estimates derived from robust tests	106-115
RINOTT, JOSEF AND POLLAK, MOSHE. A stochastic ordering induced by a concept of positive dependence and monotonicity of asymptotic test sizes	190-198
ROBERTSON, TIM AND WRIGHT, F. T. Algorithms in order restricted statistical inference and the Cauchy mean value property	645-651
ROBINSON, J. An asymptotic expansion for permutation tests with several samples	851-864

RUBIN, H. AND VITALE, R. A. Asymptotic distribution of symmetric statistics	165-170
SACKS, J. AND SPIEGELMAN, C. Consistent window estimation in non-parametric regression	240-246
SAMN, S. Ratios of off-diagonal <i>C</i> -Wishart	199-204
SCHOENFELD, DAVID. Tests based on linear combinations of the orthogonal components of the Cramér-von Mises statistic when parameters are estimated	1017-1022
SCOTT, DAVID W. AND TERRELL, GEORGE R. On improving convergence rates for nonnegative kernel density estimators	1160-1163
SCOTT, D. W., TAPIA, R. A. AND THOMPSON, J. R. Nonparametric probability density estimation by discrete maximum penalized-likelihood criteria	820-832
SEELY, JUSTUS AND BIRKES, DAVID. Estimability in partitioned linear models	399-406
SEIDEN, E. AND LAYCOCK, P. J. On a problem of repeated measurement design with treatment additivity	1284-1292
SEN, PRANAB KUMAR. On almost sure linearity theorems for signed rank order statistics	313-321
SERFLING, ROBERT J. AND BOOS, DENNIS D. A note on differentials and CLT and LIL for statistical functions, with application to <i>M</i> -estimates	618-624
SHAFFER, JULIET POPPER. Control of directional errors with stagewise multiple test procedures	1342-1348
SHAPIRO, C. P. AND WARDROP, ROBERT L. Dynkin's identity applied to Bayes sequential estimation of a Poisson process rate	171-182
SHIBATA, RITEL. Asymptotically efficient selection of the order of the model for estimating parameters of a linear process	147-164
SIEGMUND, D. AND GREGORY, P. A sequential clinical trial for testing $p_1 = p_2$	1219-1228
SIMONS, GORDON. Extensions of the stochastic ordering property of likelihood ratios	833-839
SINHA, B. K., WIEAND, H. S. AND GHOSH, J. K. Second order efficiency of the MLE with respect to any bounded bowl-shaped loss function	506-521
SPEED, T. P., DARROCH, J. N. AND LAURITZEN, S. L. Markov fields and log-linear interaction models for contingency tables	522-539
SPIEGELMAN, C. AND SACKS, J. Consistent window estimation in non-parametric regression	240-246
SPRUILL, CARL. Optimal designs for second order processes with general linear means	652-663
SRIVASTAVA, R. C. AND WANG, Y. H. A characterization of the exponential and related distributions by linear regression	217-220
STIGLER, STEPHEN M. An Edgeworth curiosum	931-934
STONE, CHARLES J. Optimal rates of convergence for nonparametric estimators	1348-1360

STRAWDERMAN, WILLIAM E. AND BRANDWEIN, ANN R. Minimax estimation of location parameters for spherically symmetric distributions with concave loss	279-284
STRAWDERMAN, W. E., BROWN, L. D. AND COHEN, A. Complete classes for sequential tests of hypotheses	377-398
STUDDEN, W. J. <i>D</i> -optimal designs for polynomial regression using continued fractions	1132-1141
STUDDEN, W. J. AND AGARWAL, GIRDHAR G. Asymptotic integrated mean square error using least squares and bias minimizing splines	1307-1325
SUSARLA, V. AND VAN RYZIN, J. Large sample theory for an estimator of the mean survival time from censored samples	1002-1016
SWEETING, T. J. Uniform asymptotic normality of the maximum likelihood estimator	1375-1381
SWENSEN, ANDERS RYGH. Deficiencies between linear normal experiments.	1142-1155
SZATROWSKI, TED H. Necessary and sufficient conditions for explicit solutions in the multivariate normal estimation problem for patterned means and covariances	802-810
SZATROWSKI, TED H. AND HERRMANN, NIRA. Expected sample size savings from curtailed procedures for the <i>t</i> -test and Hotelling's T^2	682-686
SZATROWSKI, TED H. AND MILLER, JOHN J. Explicit maximum likelihood estimates from balanced data in the mixed model of the analysis of variance	811-819
TAPIA, R. A., THOMPSON, J. R. AND SCOTT, D. W. Nonparametric probability density estimation by discrete maximum penalized-likelihood criteria	820-832
TERRELL, GEORGE R. AND SCOTT, DAVID W. On improving convergence rates for nonnegative kernel density estimators	1160-1163
THOMPSON, J. R., SCOTT, D. W. AND TAPIA, R. A. Nonparametric probability density estimation by discrete maximum penalized-likelihood criteria	820-832
TRETTER, MARIETTA J. AND WALSTER, G. WILLIAM. Exact noncentral distributions of Wilks' Λ and Wilks-Lawley <i>U</i> criteria as mixtures of incomplete beta functions: For three tests	1388-1390
TSUI, KAM-WAH, WEERAHANDI, SAMARADASA AND ZIDEK, JIM. Inadmissibility of the best fully equivariant estimator of the generalized residual variance	1156-1159
VAN RYZIN, J. AND PHADIA, E. G. A note on convergence rates for the product limit estimator	673-678
VAN RYZIN, J. AND SUSARLA, V. Large sample theory for an estimator of the mean survival time from censored samples	1002-1016
VERAVERBEKE, N., CALLAERT, H. AND JANSSEN, PAUL. An Edgeworth expansion for <i>U</i> -statistics	299-312
VIOLLAZ, ALDO JOSÉ. Asymptotic distribution of L_2 norms of the deviations of density function estimates	322-346

VITALE, R. A. AND RUBIN, H. Asymptotic distribution of symmetric statistics	165-170
WACHTER, KENNETH W. The limiting empirical measure of multiple discriminant ratios	937-957
WAGNER, T. J. AND DEVROYE, LUC P. Distribution-free consistency results in nonparametric discrimination and regression function estimation	231-239
WALSTER, G. WILLIAM AND TRETTET, MARIETTA J. Exact noncentral distributions of Wilks' Λ and Wilks-Lawley U criteria as mixtures of incomplete beta functions: For three tests	1388-1390
WANG, Y. H. AND SRIVASTAVA, R. C. A characterization of the exponential and related distributions by linear regression	217-220
WARDROP, ROBERT L. AND SHAPIRO, C. P. Dynkin's identity applied to Bayes sequential estimation of a Poisson process rate	171-182
WEERAHANDI, SAMARADASA, ZIDEK, JIM AND TSUI, KAM-WAH. Inadmissibility of the best fully equivariant estimator of the generalized residual variance	1156-1159
WEGMAN, EDWARD J. AND WRIGHT, IAN W. Isotonic, convex and related splines	1023-1035
WIEAND, H. S., GHOSH, J. K. AND SINHA, B. K. Second order efficiency of the MLE with respect to any bounded bowl-shaped loss function	506-521
WRIGHT, F. T. AND ROBERTSON, TIM. Algorithms in order restricted statistical inference and the Cauchy mean value property	645-651
WRIGHT, IAN, W. AND WEGMAN, EDWARD J. Isotonic, convex and related splines	1023-1035
WU, CHIEN-FU. Characterizing the consistent directions of least squares estimates	789-801
WU, CHIEN-FU AND CHENG, CHING-SHUI. Balanced repeated measurements designs	1272-1283
YEH, CHING-MING AND BRADLEY, RALPH A. Trend-free block designs: theory	883-893
YOHAI, V. J. AND BEN, M. S. GARCIA. Canonical variables as optimal predictors	865-869
ZERDY, GLORIA C. Risk of asymptotically optimum sequential tests ..	1110-1122
ZIDEK, J. V. AND BROWN, P. J. Adaptive multivariate ridge regression	64-74
ZIDEK, JIM, TSUI, KAM-WAH AND WEERAHANDI, SAMARADASA. Inadmissibility of the best fully equivariant estimator of the generalized residual variance	1156-1159

NOTES

ANDERSON, T. W. Correction to "Estimating linear restrictions on regression coefficients for multivariate normal distributions" ...	1400
ARNOLD, BARRY C. AND GROENEVELD, RICHARD A. Correction to "Bounds on expectations of linear symptomatic statistics based on dependent samples"	1401

CONTENTS OF VOLUME 8

xi

BHATTACHARYA, R. N. AND GHOSH, J. K. Correction to "On the validity of the formal Edgeworth expansion"	1399
CHANG, DER-SHIN AND WONG, CHI SONG. Correction to "Design of optimal control for a regression problem"	1402
CLARK, VIRGINIA A. AND TARTER, MICHAEL E. Correction to "Order statistics of logistic variates"	935
DÍAZ, JOAQUÍN AND O'REILLY, FEDERICO J. Correction to "On a criterion for simultaneous extrapolation in nonfull rank normal regression"	1177-1178
GHOSH, J. K. AND BHATTACHARYA, R. N. Correction to "On the validity of the formal Edgeworth expansion"	1399
HINKLEY, DAVID V. Correction to "Predictive likelihood"	694
MILLER, RUPERT G. Editorial note on Pao-Lu Hsu	456
O'REILLY, FEDERICO J. AND DÍAZ, JOAQUÍN. Correction to "On a criterion for simultaneous extrapolation in nonfull rank normal regression"	1177-1178
RAO, M. M. Correction to "Asymptotic distribution of an estimator of the boundary parameter of an unstable process"	1403
SILVERMAN, BERNARD W. Addendum to "Weak and strong uniform consistency of the kernel estimate of a density and its derivatives"	1175-1176
SUSARLA, V. AND VAN RYZIN, JOHN. Addendum to "Large sample theory for a Bayesian nonparametric survival curve estimator based on censored data"	693
TARTER, MICHAEL E. AND CLARK, VIRGINIA A. Correction to "Order statistics of logistic variates"	935
VAN RYZIN, JOHN AND SUSARLA, V. Addendum to "Large sample theory for a Bayesian nonparametric survival curve estimator based on censored data"	693
WALTER, GILBERT G. Addendum to "Properties of Hermite series estimation of probability density"	454-455



